

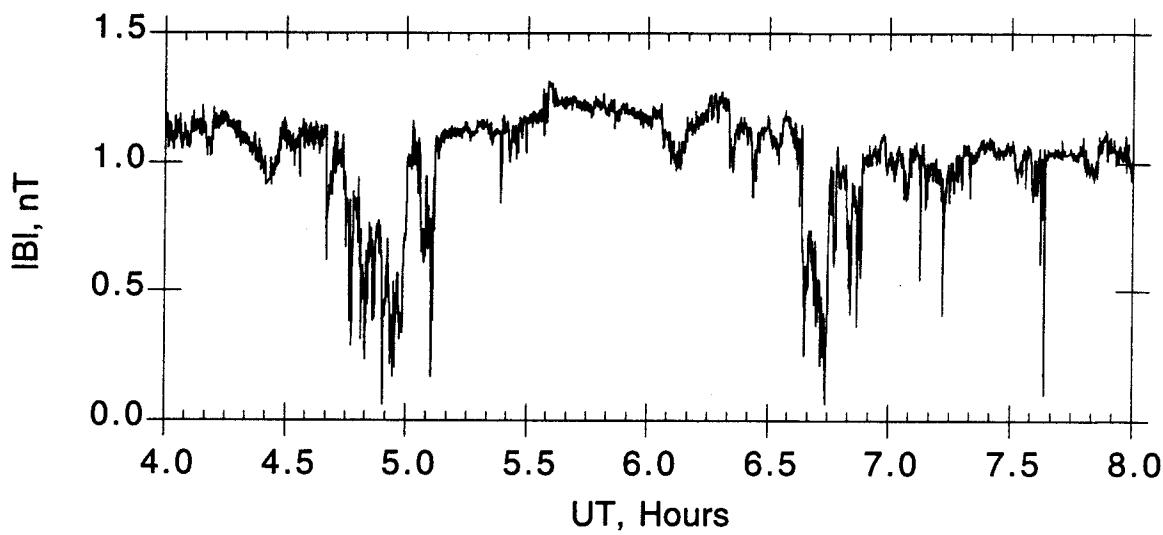
Mirror Instability Criterion

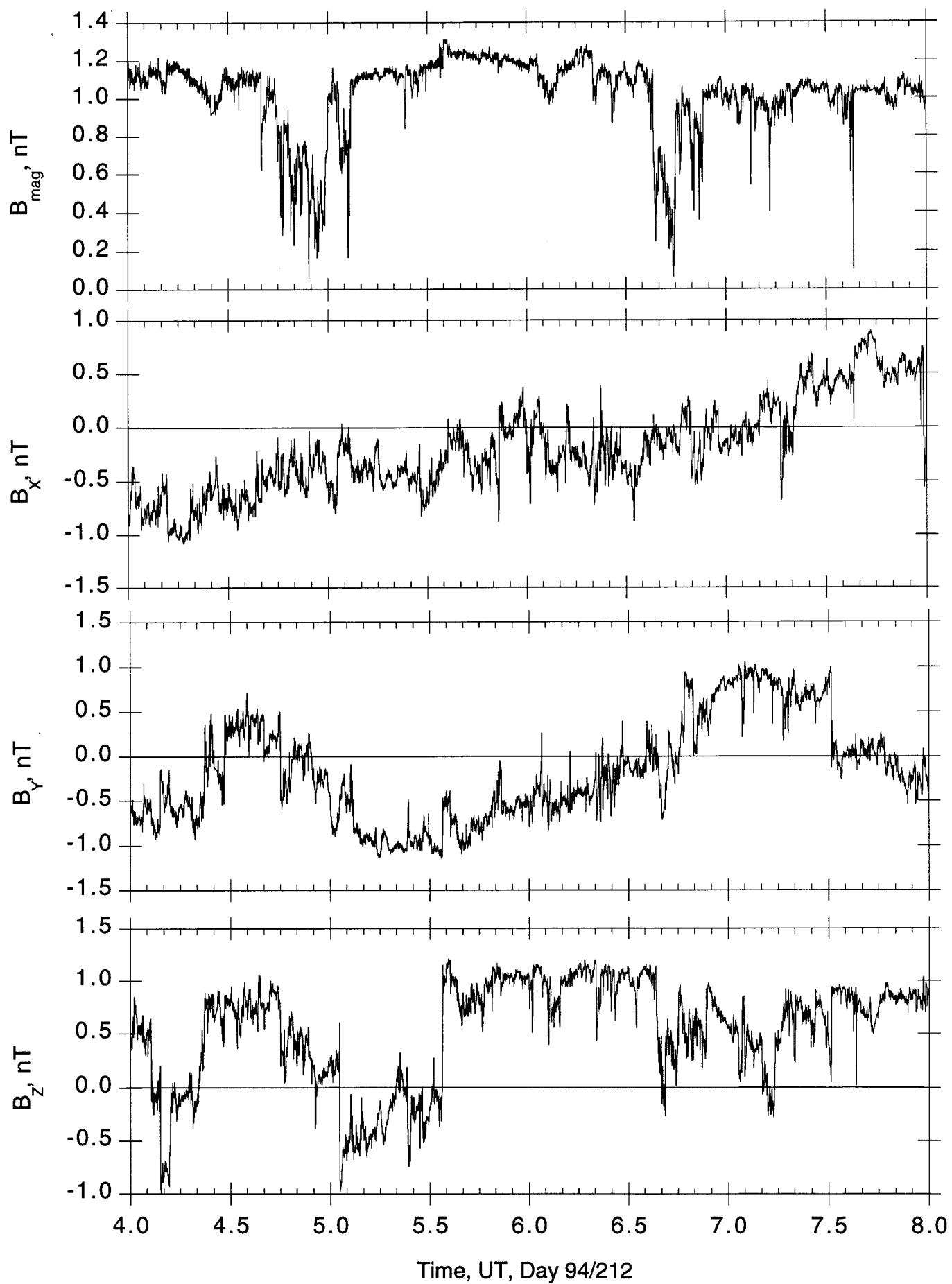
$$R = \frac{\beta_{\perp} / \beta_{\parallel}}{1 + 1 / \beta_{\perp}} > 1$$

$$\beta_{\perp} = \frac{\sum_i n_i k T_{\perp i}}{(B^2 / 8\pi)}$$

$$\beta_{\parallel} = \frac{\sum_i n_i k T_{\parallel i} + \sum_i n_i m_i (V_i - V_{cm})^2}{(B^2 / 8\pi)}$$

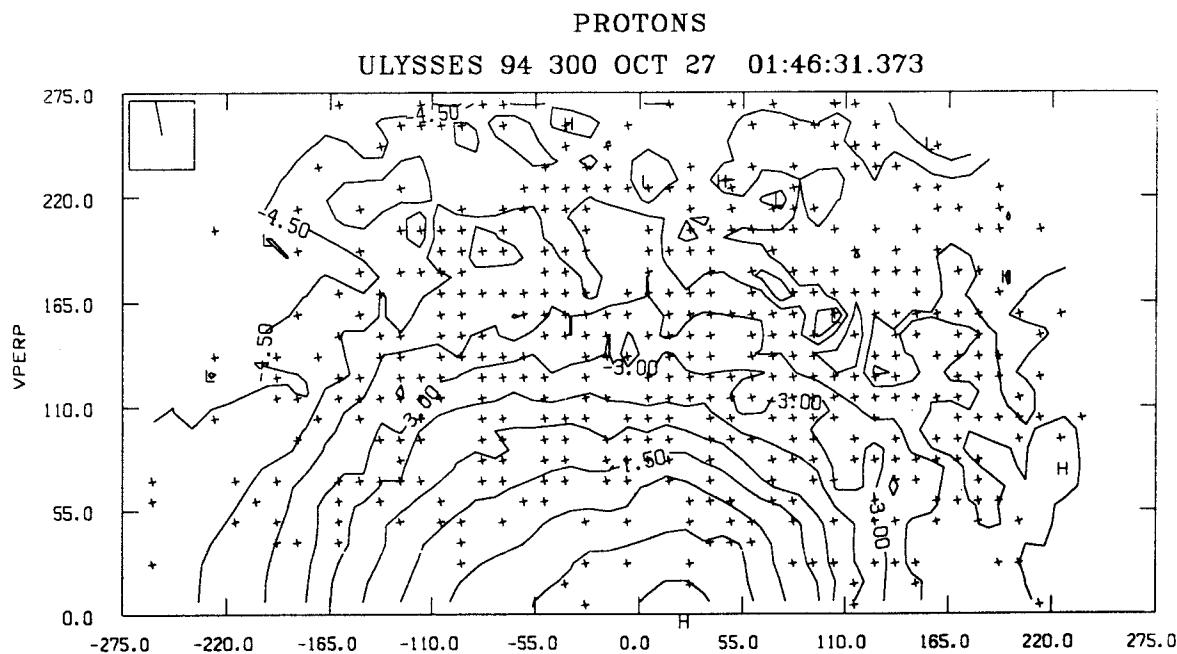
1994, Day 212
R = 2.8 AU, λ = -75.5 deg



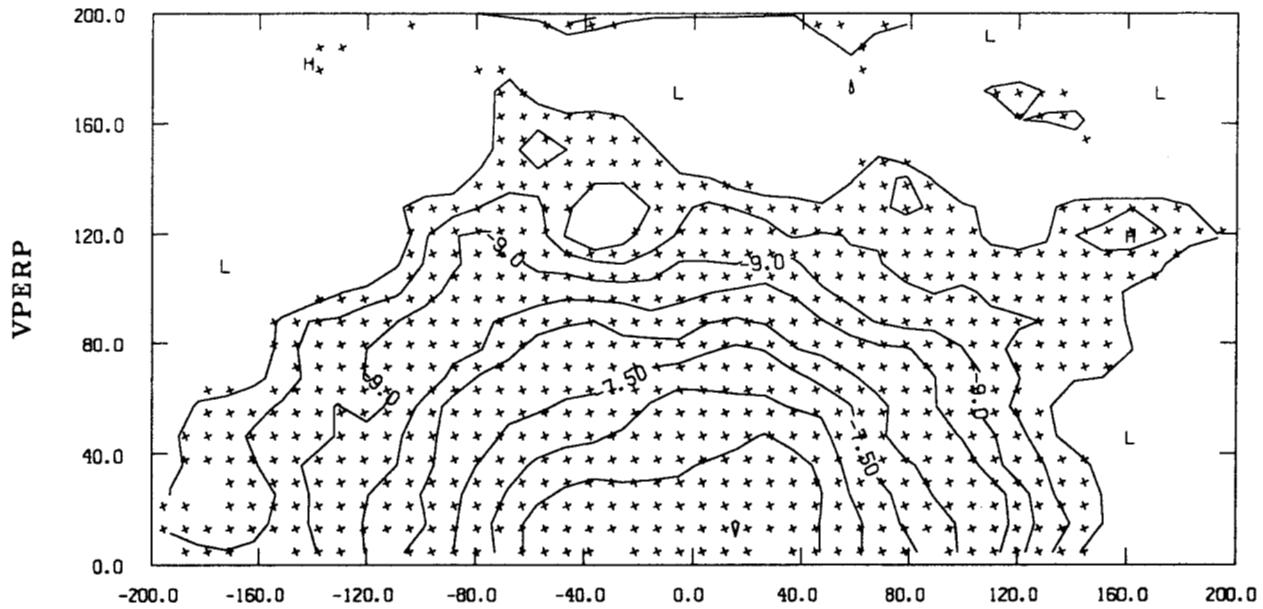


Deconvolution Method

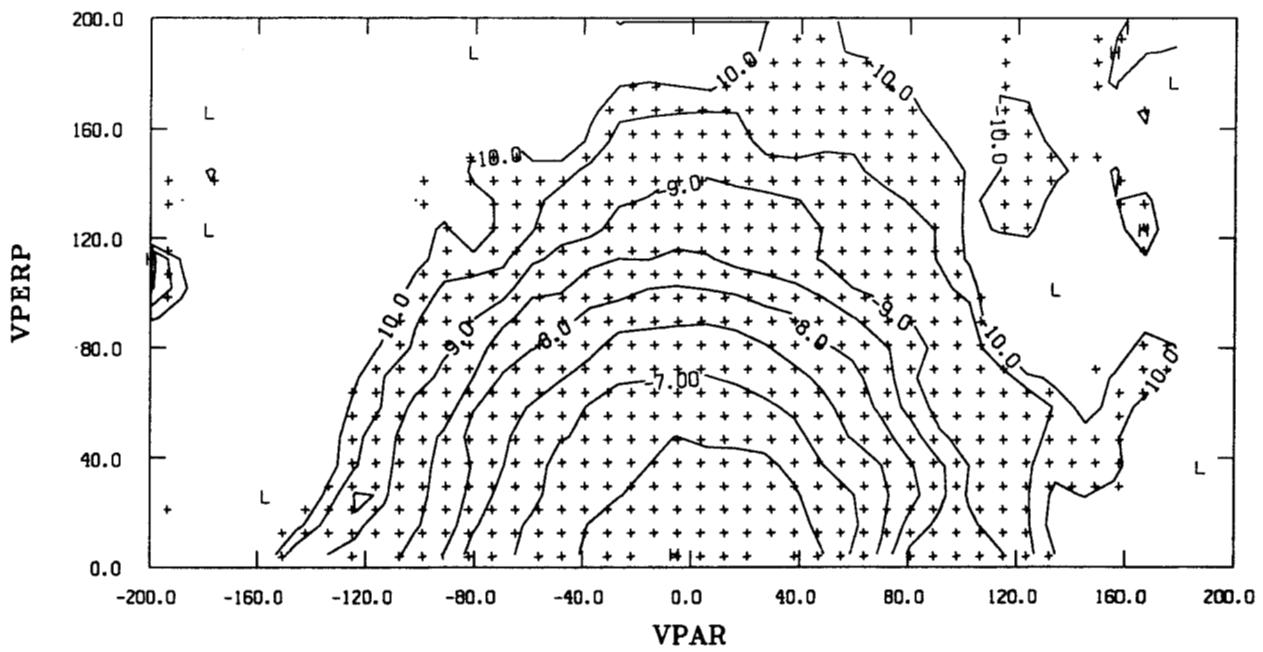
1. Assume $f(v)$ is uniform within each 3-D pixel in velocity space
 2. Use measured magnetic field to rotate data into magnetic coordinate system (assuming gyrotropy)
 3. Calculate contours of $f(v)$ in $V_{||}$ - V_{\perp} coordinates
 4. Use contours to redistribute the counts and recalculate $f(v)$ for each of 8×8 subpixels per pixel
 5. Iterate steps 3 and 4 until have convergence.



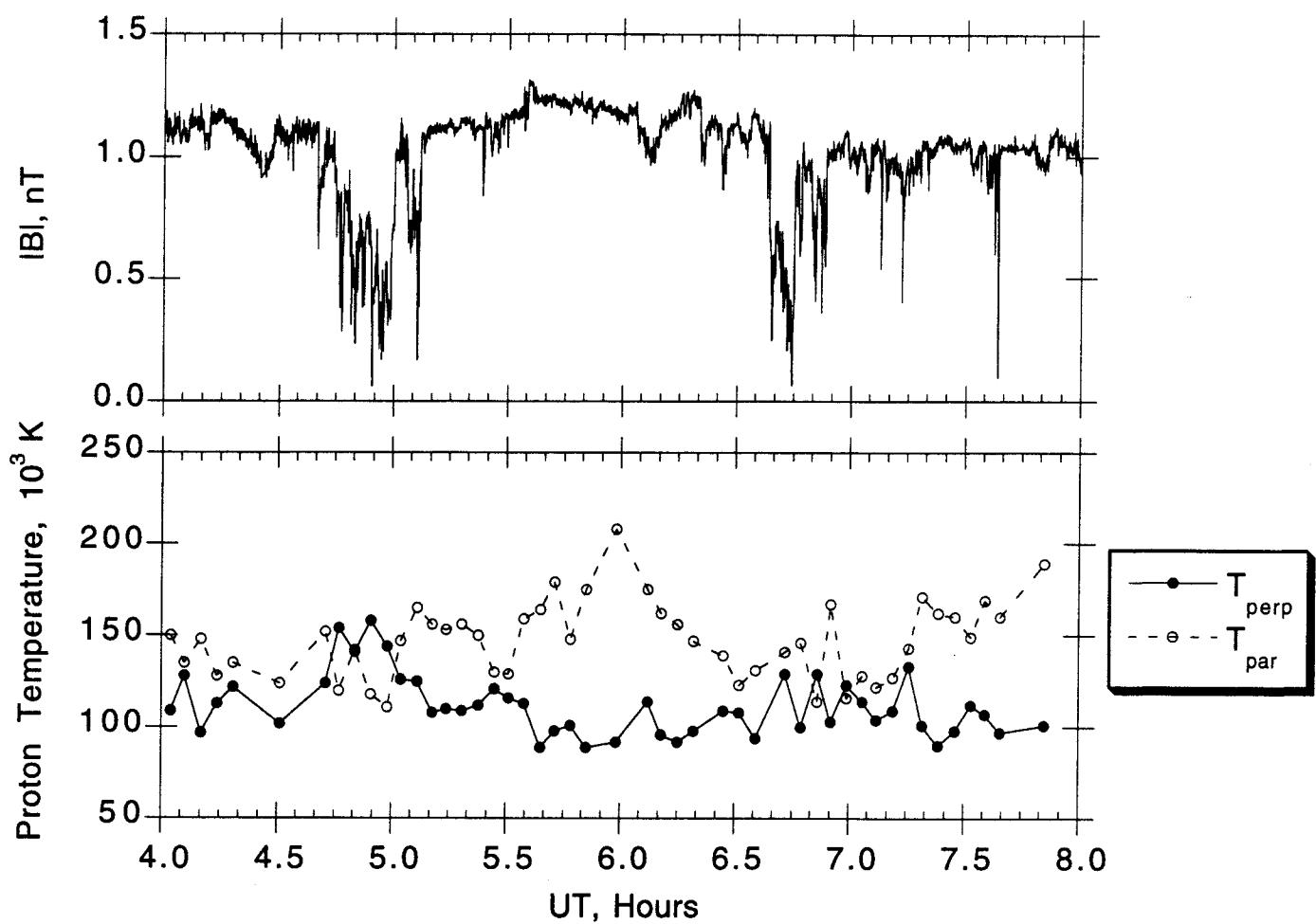
PROTONS OUTSIDE HOLE 94/212/0511



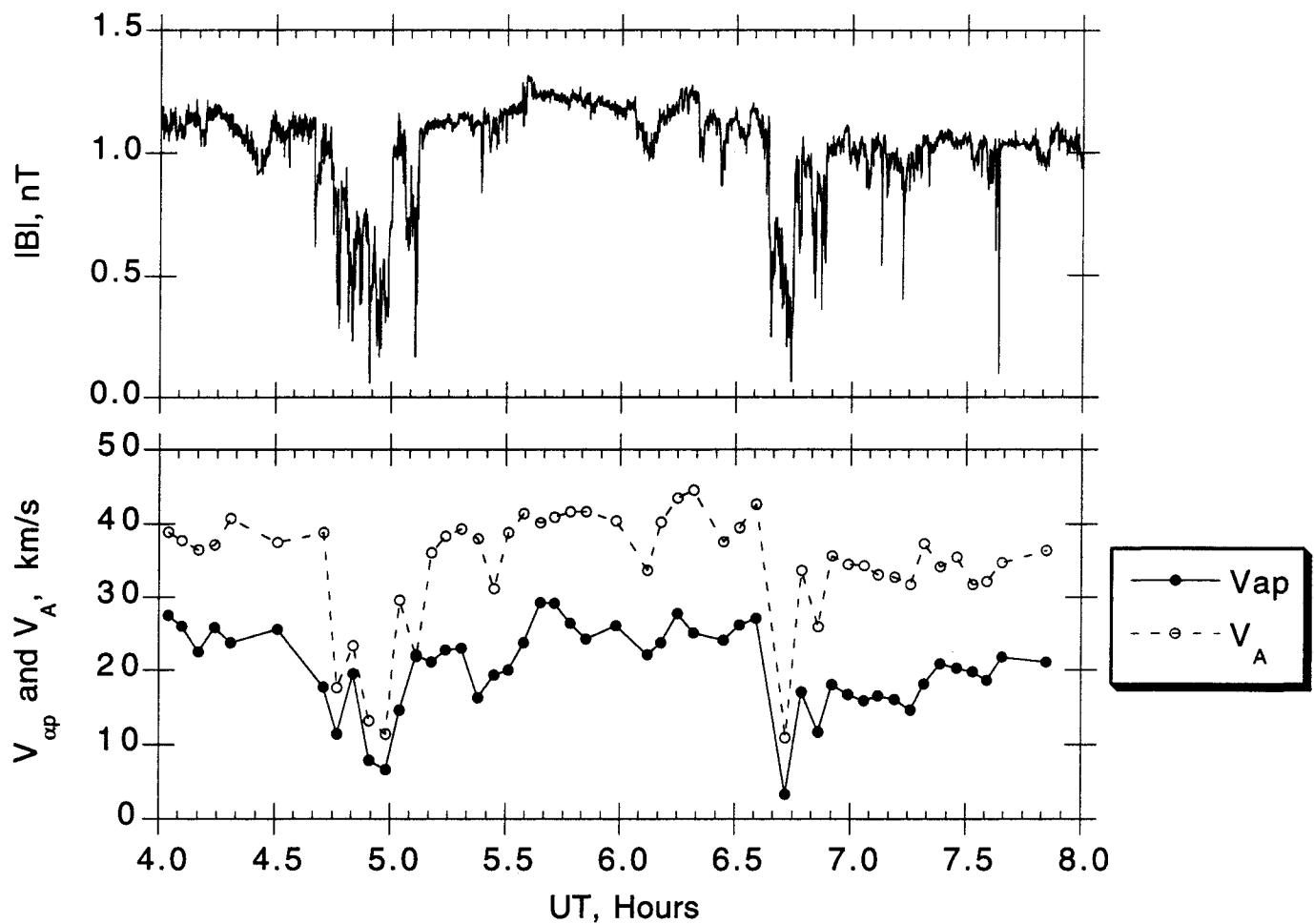
PROTONS IN HOLE 94/212/0454



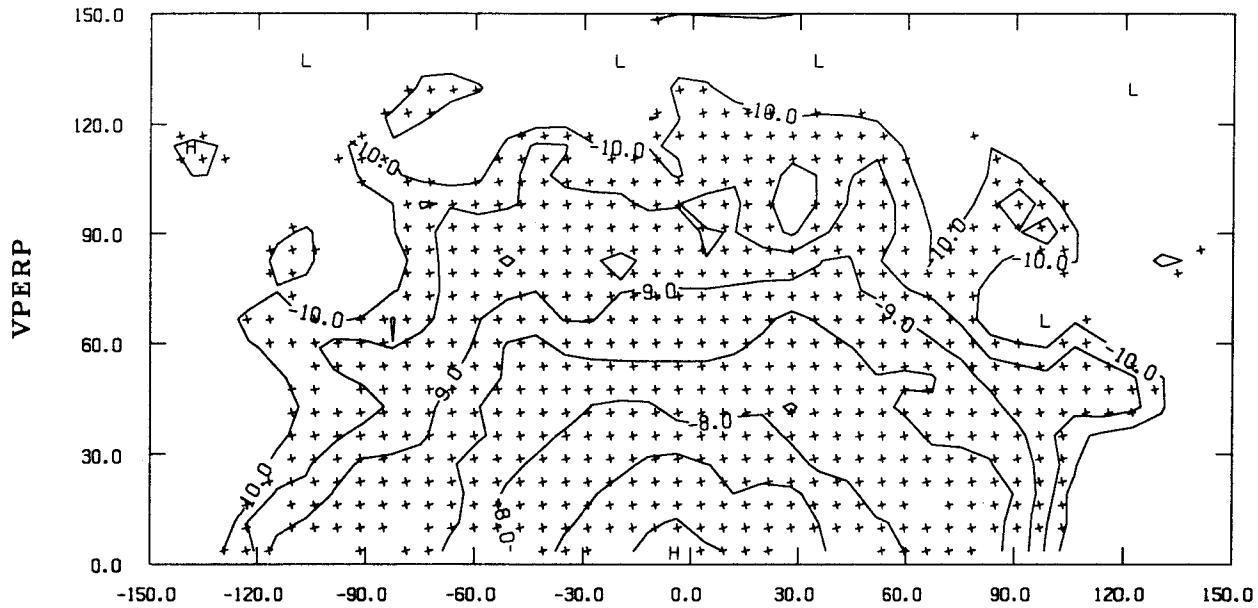
1994, Day 212
 $R = 2.8$ AU, $\lambda = -75.5$ deg



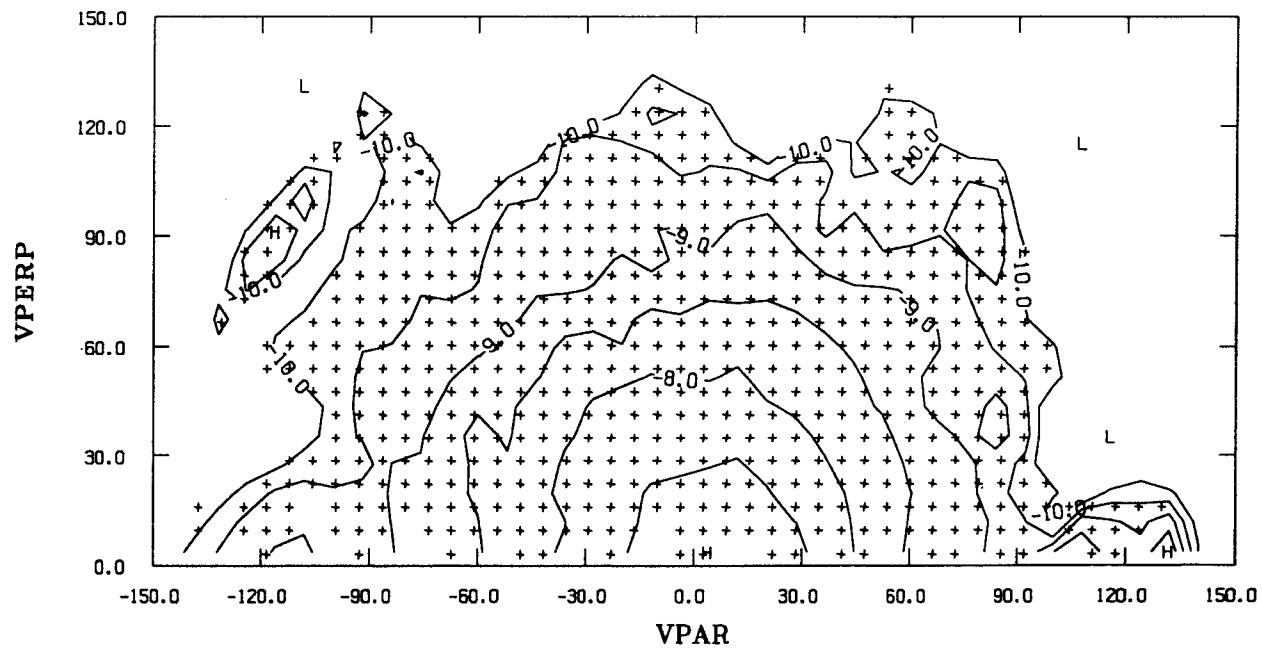
1994, Day 212
 $R = 2.8$ AU, $\lambda = -75.5$ deg



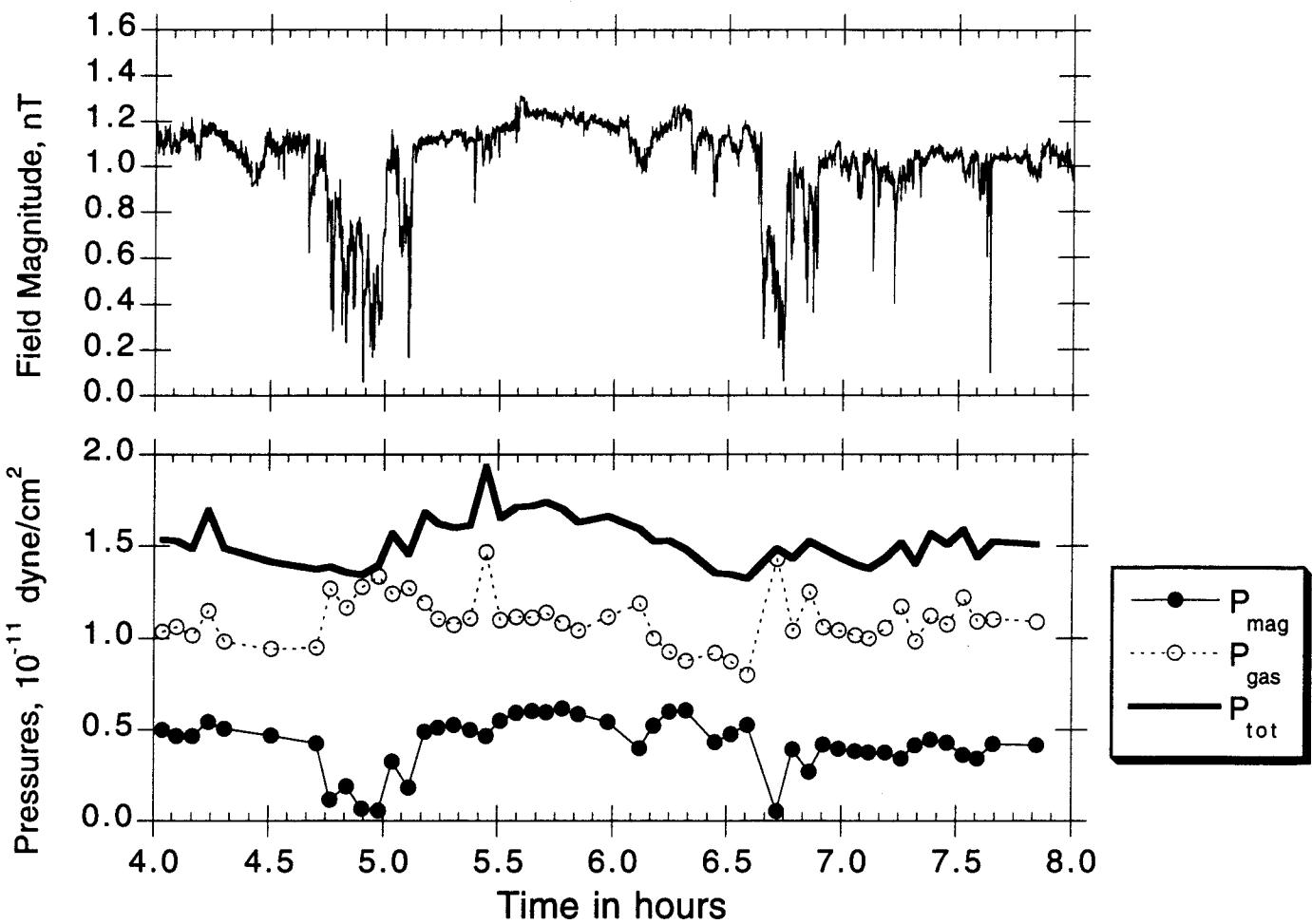
ALPHAS OUTSIDE HOLE 94/212/0511



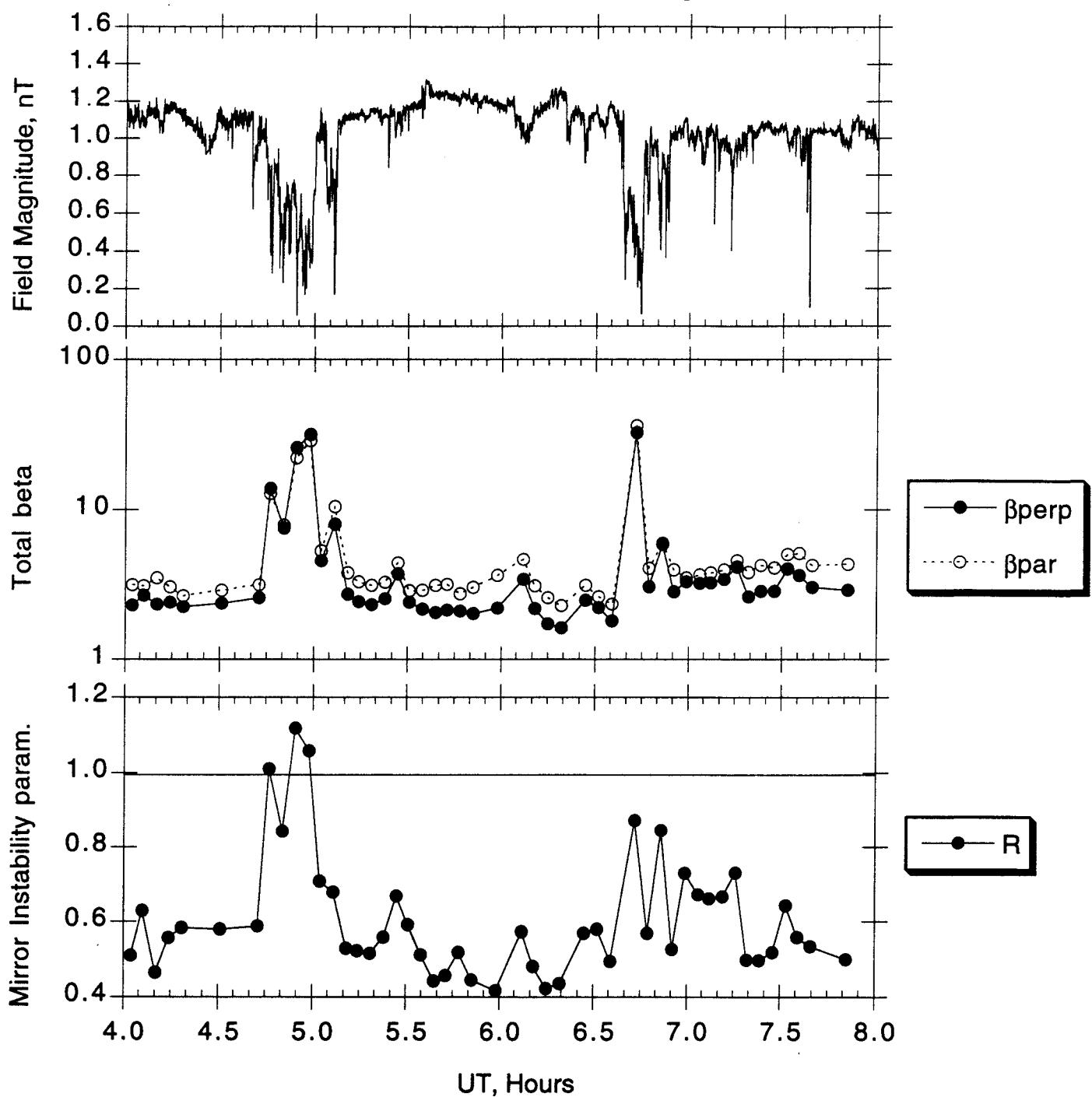
ALPHAS IN HOLE 94/212/0454



1994, Day 212
 $R = 2.6$ AU, $\lambda = -75.5$ deg



1994, Day 212
 $R = 2.6$ AU, $\lambda = -75.5$ deg



Possible scenarios for magnetic hole observations:

- (1) Pre-existing hole; solar origin?
Differential streaming limited by low Alfvén speed
- (2) Hole created in situ
Something (such as a TD) causes a decrease in B
Pressure balance increases n
The Alfvén speed drops
The differential streaming V_{pp} and V_{ap} become unstable
The lost differential streaming energy goes into T_\perp
 β_\perp increases and $\beta_{||}$ decreases
The plasma becomes increasingly mirror-mode unstable